

NO₂ Primary NAAQS— Overview of Final Rulemaking



Briefing for OMB
December 16, 2009

Office of Air and Radiation
Office of Air Quality Planning and Standards

Background

- Current NO₂ NAAQS: **Annual standard**, level is 53 ppb, all areas of U.S. are in **attainment**
- Existing NO₂ monitors (about 400 total) are primarily sited to measure **area-wide** concentrations
- NO₂ concentrations can be 30-100% **higher near roads** than away from the road
- Individuals who spend time on or near major roadways (residence, schools, commuting) can experience short-term NO₂ exposures **higher than measured by current network**
- Schedule for ongoing review
 - December 16, 2009: Send draft of rule to OMB for interagency review
 - January 22, 2010: Court schedule requires signature of final rule

Key Conclusions from the ISA and REA

- The evidence relating short-term (minutes to hours) NO₂ exposures to respiratory morbidity was judged to be sufficient to infer a likely causal relationship
- This conclusion is supported by epidemiologic and experimental evidence
- Epidemiologic studies (1- to 24-hours)
 - Generally report positive associations with respiratory morbidity endpoints, with a number statistically significant
 - Many of these studies were conducted in areas with NO₂ concentrations below those allowed by the current NAAQS
 - Evidence for respiratory effects is consistent (associations reported in numerous locations with variety of methodological approaches) and coherent (respiratory health outcomes are logically linked together)
 - NO₂ effect estimates generally remain robust in multi-pollutant models
- Experimental studies (30-minutes to 3-hours)
 - Human clinical and animal toxicological studies support the plausibility of the link between NO₂ and respiratory morbidity reported in epidemiologic studies
 - Provide evidence for effects of NO₂ on lung host defense and immunity, airway inflammation, airway response
 - A meta-analysis of human clinical studies reported that

small but significant increases in nonspecific airway hyperresponsiveness were observed

at 0.1 ppb NO₂ for 60-min exposures in asthmatics.

Overview of Final NO₂ NAAQS

- Administrator judges that **current annual standard alone is not requisite** to protect public health with an adequate margin of safety, based on
 - **Epidemiologic evidence** for NO₂-associated respiratory effects in locations where annual average NO₂ concentrations were below the level of the current annual NO₂ NAAQS
 - Supported by **RA analyses**: Policy assessment chapter concluded that risks estimated to be associated with air quality adjusted upward to simulate just meeting the current standard can reasonably be concluded to be important from a public health perspective
 - **ASAC**

concurs with
EPA

s judgment that the current NAAQS does not protect the
public

Overview of Final NO₂ NAAQS (Continued)

- **Level of new 1-hour standard:**
 - Based on both **human clinical** and **epidemiologic** studies, considered within the context of available information on the **NO₂ concentration gradient around roads**
- **Clinical studies:** The Administrator concludes that the NO₂-induced increases in airway responsiveness reported for exposures to NO₂ concentrations at or above 100 ppb could be adverse for some asthmatics; however, she also notes that important uncertainties exist with regard to the extent to which the reported effects are adverse
 - Therefore, she concludes that a standard level no higher than 100 ppb is appropriate to reflect a cautious approach to considering the uncertainty associated with the NO₂-induced increase in airway responsiveness, but that this uncertainty also supports setting a standard level no lower than 100 ppb
- **Epidemiologic studies:** Based on available information on the NO₂ concentration gradient around roads, a standard level of 100 ppb for a standard reflecting the maximum allowable NO₂ concentration anywhere in the area would be expected to maintain area-wide NO₂ concentrations below those measured in locations where key U.S. epidemiologic studies have reported associations with respiratory-related emergency department visits and hospital admissions
 - A group of 5 key U.S. epidemiologic studies provide evidence for associations between NO₂ and respiratory-related emergency department visits and hospital admissions in locations where 98th percentile 1-hour daily maximum NO₂ concentrations measured at area-wide monitors ranged from 8 to 94 ppb

Overview of Final NO₂ NAAQS (Continued)

- **Form:** **99th percentile** of the 3-year average of the annual distribution of 1-hour daily maximum NO₂ concentrations
- **Monitoring network:** To measure maximum NO₂ concentrations, a **2-tiered NO₂ monitoring network** will be established, including both **near-road and area-wide monitors**
 - Near-road monitors will be required within 50 meters of the roads expected to cause the maximum NO₂ concentrations in an area (considering traffic volume, fleet mix, road design, etc.)
 - 167 near-road monitors in 143 areas and 52 area-wide monitors
 - 1 near-road monitor in Core Based Statistical Areas (BSAs) with 350,000 or more people
 - A second near-road monitor in BSAs with 2.5 million people or more OR any BSA that has one or more road segments with 250,000 Annual Average Daily Traffic (AADT) counts
 - 1 area-wide monitor in BSAs with 1 million or more people
 - Additional monitors may be required, at the discretion of the Regional Administrator, for example, if maximum concentrations are expected to occur in locations other than near a major road (e.g., multiple smaller roads and/or stationary sources)